

**SCANNED**

**CORRECTIVE ACTION PROGRAM  
PROPOSAL**

Prepared for:

**ALASKA MARINE LINES, INC.**  
Seattle, Washington

Prepared by:

**ENVIRONMENTAL SERVICES, LTD.**  
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## **CORRECTIVE ACTION PROGRAM PROPOSAL FOR ALASKA MARINE LINES, INC.**

### **1.0 INTRODUCTION**

Environmental Services, Ltd. (ESL) is submitting this proposal in response to a request from Alaska Marine Lines, Inc. (AML) to: review the status of previous environmental corrective actions at properties in Seattle and Kent, Washington, and Juneau and Ketchikan, Alaska; suggest specific tasks necessary to resolve any outstanding regulatory compliance issues at the properties; and propose alternatives and recommendations for the most cost effective method of treatment and disposal of the contaminated materials.

Since the property at 5500 West Marginal Way, Southwest (the Dock One Site) is scheduled for construction during 1993, this proposal integrates corrective action for all sites and the construction objectives for the Dock One Site. We propose to make use of the problematic stockpiles of contaminated material from previous remedial activities at the AML sites by incorporating this material into the construction at the Dock One Site.

The objectives of this proposal are:

- 1) Present efficient and cost-effective solutions for environmental problems at the AML sites;
- 2) Provide a program which:
  - eliminates the existing contaminated stockpiled materials in the most cost-effective manner possible,
  - avoids the potential long-term liability associated with the use of landfill disposal sites, and
  - complies with Washington and Alaska state regulatory requirements;
- 3) Suggest a way to reduce the construction costs at the Dock One Site.

We propose to schedule the cleanup activities so as to have the remediated soils brought to AML designated engineering standards and available for use in the

Dock One Site construction by the beginning of August, 1993. Our final report will be submitted to Alaska Marine Lines in September.

## 2.0 BACKGROUND

ESL and AML representatives have discussed the current status of the seven sites where remediation activities have been performed and which are the subject of this proposal. Formal reports for six of the properties were reviewed. The status of each property is summarized below. The recommendations for treatment and disposal of the stockpiled materials are organized into task format in Section 4.0, Scope of Work.

### 2.1 5500 West Marginal Way, SW Seattle, Washington (Dock One Site)

#### *Reports*

A Site Assessment was completed for Wright Schuchart by Kennedy/Jenks/Chilton (KJC) in January, 1989. A Site Investigation was conducted for AML by KJC in March, 1989.

Two underground storage tanks (USTs) were removed from the property by Wright Schuchart and a report was filed with the Washington Department of Ecology (WDOE). ESL has requested a copy of this report; we have not had a chance to review it yet.

On April 11, 1991, an Early Notice Letter, stating that the property had been designated a C-1 State Site (Confirmed Hazardous Substance Site), was issued to AML. ESL has confirmed with Norman Beck of WDOE (who conducted an inspection of the site prior to issuing the Early Notice Letter) that surface staining, presumably petroleum products and possibly paint products, was the basis for the Early Notice Letter. ESL has requested a copy of Beck's report.

#### *Environmental Issues*

##### a) Metals

KJC found elevated levels of copper, lead, and zinc in near shore sediments of the Duwamish River adjacent to the property. The laboratory analyses were not normalized for carbon, however; therefore, the true

value of the analyses is unknown. Furthermore, WDOE sediment management standards (WAC 173-204) as applicable to the Duwamish Waterway are a currently under discussion by the Sediments Liability Work Group.

KJC also reported elevated metal levels from shallow soil samples (SS-1 and SS-2) apparently related to accumulations on the surface of sandblasting grit. It is recommended that WDOE compliance requirements be determined and, if necessary, the accumulations removed and disposed of.

Because dredging of onshore sediments is anticipated in the construction at the Dock One Site, we recommend that samples be collected, and analyzed and normalized for carbon to determine the concentration of heavy metals and the toxicity of the sediment. These tests will determine if the sediments meet the Puget Sound Disposal Standards, which could allow disposal of the dredge spoils in a designated area of Elliott Bay.

b) Petroleum

Petroleum contamination was identified in one test pit (TP-2) located near the subsequently removed USTs. The total petroleum hydrocarbon (TPH) level in the sample was 1,700 ppm. Surface staining was noted by WDOE in the same area. Soil boring samples taken elsewhere on the property showed TPH levels within acceptable limits. The spatial relationship between the TP-2 sample, the observed staining, and the UST excavation should be determined in order to ascertain if petroleum contamination at this site is an issue.

c) Phenolic Compounds

Phenolic compounds associated with buried wood were identified in TP-2. The spatial relationship between TP-2 and the UST excavation should be determined, and a definitive position on buried wood and phenolic compound release should be obtained from WDOE, if possible.

d) Polynuclear Aromatic Hydrocarbons

Polynuclear aromatic hydrocarbons (PAH) thought to be associated with creosoted wood were detected in two onshore soil borings, but the levels were well below the cleanup guidelines. Near shore sediment samples contained PAH levels that exceed the cleanup

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guidelines. Because these samples were taken from the Duwamish, the extent of AML's liability is unknown; however, we recommend that any sediments dredged during construction be analyzed for both phenolic and PAH compounds.

## **2.2 5615 West Marginal Way, SW Seattle, Washington**

### *Reports*

Dames and Moore supervised the removal of two USTs from this site on December 13, 1990, and submitted a report to AML on March 21, 1991. A Soil and Groundwater Assessment Report was submitted to AML on April 19, 1991. Quarterly groundwater monitoring reports have subsequently been submitted, the latest dated November 5, 1992. Laboratory analytical results for the soil stockpile were reported on November 12, 1992.

### *Environmental Issues*

Both the soil and groundwater were determined to be contaminated with levels of diesel, lead, and BTEX (benzene, toluene, ethylbenzene, and xylenes) which exceed WDOE guidelines. Approximately 640 cubic yards of suspected contaminated soil are stockpiled on site. Laboratory analyses of the stockpiled soil showed TPH (diesel) levels from 78 to 9,588 ppm, and TPH (gasoline) levels as high as 0.41 ppm for benzene.

We recommend moving the stockpiled soil to the Kent, Washington site for treatment (see Section 2.3 below) and eventual use in the Dock One Site construction. After removal of the stockpile, the existing containment barriers should be removed and disposed of, and all traces of soil remaining on the paved surface below should be cleaned up.

The frequency of groundwater monitoring sampling should be reduced to a maximum of twice per year for monitoring wells MW-1, 2, and 3, and once per year for MW-4 and 5, for a period of one year or until the concentrations in the wells drop below action levels.

## **2.3 Kent, Washington**

### *Reports*

Shannon and Wilson, Inc. supervised the removal of five USTs on March 2, 1990, and submitted a report to Lynden Transport in June, 1990. Monitoring reports for the excavated soil stockpile have subsequently been submitted by Shannon and Wilson.

#### *Environmental Issues*

The latest report on the soil stockpile monitoring at this site is dated September 11, 1992. The results of laboratory analyses for TPH show levels ranging from 210 to 1,000 ppm, placing this material in the WDOE Class III Soils range. There are currently approximately 1,200 cubic yards of soil stockpiled on site.

We recommend that a forced air bio-vent cell treatment system be constructed at this site to accelerate bioremediation of the soils with contaminant levels exceeding 500 ppm. Based on the available information, we believe that these soils can be treated to levels within WDOE guidelines in time to allow the material to be used for construction at Dock One.

2.4 7100 Second Avenue  
Seattle, Washington

#### *Reports*

Dames and Moore conducted a Site Assessment and submitted a report dated March 6, 1991. They have subsequently submitted quarterly groundwater monitoring reports

#### *Environmental Issues*

The soil at the site is contaminated with heavy petroleum to a depth of at least 30 feet. Dames and Moore estimated that the volume of soil containing levels that exceed the Model Toxics Control Act (MTCA) limits may be 16,700 cubic yards. In addition, benzene and xylene levels above MTCA limits were detected in the groundwater.

Material excavated from two Juneau, Alaska sites and one Ketchikan, Alaska site is stored on this site in ore pots. The estimated volume of contaminated material in the pots is 156 cubic yards. An estimated 55 cubic yards of additional material from Ketchikan is also stored here. Only two laboratory analytical

results are available, both for the Juneau soil. These results show TPH levels of 480 ppm and 3,400 ppm.

The water should be removed from the soil containers, tested, and disposed of using appropriate procedures. The soil should then be transported to the Kent site, treated and used in the Dock One Site construction (see Section 2.3).

Remediation of the contaminated soil and groundwater at the Second Avenue site are beyond the scope of this proposal. We do suggest, however, that the groundwater monitoring sampling be conducted only twice per year and only from those wells that are downgradient of the contaminated areas.

## **2.5 Juneau and Ketchikan, Alaska**

The report on the Ketchikan site should be obtained and reviewed to determine the type and degree of contamination in the soil from this site.

The Alaska Department of Environmental Conservation (ADEC) should be notified of the remediation and final disposition of the soil from all three sites in order to obtain closure of the cleanup efforts at the sites.

## **3.0 TREATMENT/DISPOSAL ALTERNATIVES**

The State of Washington Model Toxics Control Act, WAC 173-340-360, provides guidelines for selecting treatment or disposal methods. To the maximum extent practical, permanent solutions are preferred. Options for cleanup action are listed below in descending order of preference (page 29, MTCA):

- (1) Reuse or recycling;
- (2) Destruction or detoxification;
- (3) Separation or volume reduction followed by reuse, recycling, destruction, or detoxification of the residual hazardous substance;
- (4) Immobilization of hazardous substances;
- (5) On-site or off-site disposal at an engineered facility designed to minimize the future release of hazardous substances and

in accordance with applicable state and federal law;

- (6) Isolation or containment with attendant engineering controls; and
- (7) Institutional controls and monitoring.

Combinations of the above are expected in cleanup procedures, but the options are specifically prioritized by order of preference to "make it more difficult to select a cleanup action with a low preference without a careful explanation of why technologies above it have not been used".

ESL and AML representatives have discussed 1-5 above. Options 6 and 7 are not considered to be feasible or desirable.

ESL representatives discussed Option 4, Immobilization, with WDOE and concluded that incorporation into concrete of soils with contamination levels above Class II standards (100 ppm gasoline, 200 ppm diesel) might require ongoing monitoring of groundwater at the immobilization site, as well as institutional controls. ESL does not recommend this option.

Incorporation of contaminated soils into asphalt is considered destruction of the contaminant, and is acceptable to WDOE. The cost of asphaltting 3100 tons of soil is nearly \$250,000. This cost does not include sampling, sorting, sizing, supervision, transport of the soils or final product, or report preparation. If AML wanted to use the asphalt concrete, it would be available for purchase.

Option 5, disposal at a landfill, at about \$60.00 a ton, would cost more than \$185,000, including trucking from the existing stockpiles to 3rd and Lander. This choice also involves sampling, cleanup of the sites and report preparation, and carries with it a potential liability in the landfill.

Thermal Desorption (Incineration) is also an acceptable option. The cost of this process would be on the order of \$60.00 per ton, including applicable costs, or a total of slightly more than \$200,000 for what needs to be processed. The cleaned material would be available for use at Dock One.

For this project, ESL recommends combining options 1-3: destruction of the petroleum contaminant through bioremediation, with possible separation of untreatable materials at the initial stage, and reuse of the treated materials in the construction at the Dock One Site.

The selection of a cleanup technique is based on determining the method that will successfully achieve the desired result for the least cost. Of the feasible options for this project (bioremediation as presented in this proposal, incineration, asphaltization, or placing the soils in a land fill), we conclude the best, most cost-effective method is bioremediation and reuse of the stockpiled material.

#### 4.0 SCOPE OF WORK

The scope of work of this proposal is limited to the procedures necessary for proper disposal of stockpiled materials. Other recommendations described in Section 2.0, Background are beyond the immediate objectives and work plan of this proposal. The projected timeline for completion of the tasks described below is illustrated in Figure 1.

##### *PHASE I*

During Phase I, all contaminated soils currently located at sites other than the Kent site will be loaded into end dump trucks, covered, and transported to Kent. Materials from each site will be stockpiled separately.

The contaminated soil will then be sampled, tested and analyzed to determine the grain size distribution and its treatability by bioremediation. Any material which cannot be adequately treated by bioremediation will be segregated, and an alternative treatment or disposal process chosen. Usually, this material is limited to a small volume of fine silt and clay size materials.

##### *PHASE II*

Phase II will entail designing, constructing and operating the soil treatment system(s), and placing them into operation. The proposed remediation system, a forced air bio-vent treatment cell, will be constructed at the same location as the current

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landfarming operation at Kent. Each stockpile will be screened and crushed to 1 1/2 inch minus. Fertilizer and Sansorb, a biodegradable oil sorbent and remediation enhancer, will be blended into the contaminated soil during the screening process. The material will then be placed in the bio-vent cell and covered with a clear polyethylene membrane. Operation and maintenance will be limited to periodic inspections to monitor the performance of the blower and maintenance of the cover. Confirmation sampling will be conducted toward the end of the treatment process to confirm that contaminant concentrations have been reduced to acceptable levels.

### *PHASE III*

After remediation is complete, the soil will be blended with clean sand and gravel to reach the construction specifications designated by AML. The fill material will then be delivered to the Dock One Site for use as a leveling course prior to placement of the pavement. Approximately 4,000 tons of classified fill will be produced. The Kent site will be cleaned and all remediation equipment removed.

Phase III includes the preparation of reports to the Alaska Department of Environmental Conservation (ADEC) regarding the final disposition of the soils from the three sites in Alaska. It also includes the preparation of closure reports for the Washington sites.

## **5.0 ESTIMATED COSTS**

The project budget reflects the segregation of work into phases. We believe this forecast is the closest estimate possible at this time, given the additional testing and screening which needs to be done to characterize the material to be bioremediated. Sampling, size separation, and chemical testing is an early part of the materials-handling regimen. Their results will provide the basis for estimating the amount of crushing necessary, the volume of additional processed aggregate to be purchased, the quantity of fertilizer required, and the appropriate volume of sorbent to add to the remediation cell.

The major components of the budget are as follows:

MOBILIZATION

\$ 5,176

## PHASE I

Load and transport 650 cu yds from Container Freight Station to Kent.	\$11,480
Clean area and discard waste.	
Sample, test and remove water from ore pots at 7100 2nd Ave S	1,401
Remove 210 cu yds from ore pots and half high containers, transport to Kent.	3,063
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Total Phase I	\$15,944

## PHASE II

Sample, test, and characterize oil-contaminated material at Kent.	\$3,036
Design bio-vent treatment cell, purchase and install air movement system. This does not include the electrical hookup.	16,423
Acquire additional aggregate, fertilizer and sorbent; crush, screen and mix components; build remediation pile.	26,119
Monitor and test progress of bioremediation, not including electric power.	9,198
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Total Phase II	\$54,776

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remediated material	\$32,496
on site.	
process and	7,431
ated material.	
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Prepare	
for	

# CORRECTIVE ACTION PROGRAM PROPOSAL FOR ALASKA MARINE LINES, INC.

## 1.0 INTRODUCTION

Environmental Services, Ltd. (ESL) proposal in response to a request from Lines, Inc. (AML) to: review environmental corrective review Ketchikan and Kent, Washington at the proper outst; recommend treatment

## 6.0 WORK PRODUCTS

A written report of all ESL remediation activities and results, including all pertinent backup documentation, will be prepared and submitted to AML and WDOE after completion of the work. Written acknowledgment of proper disposal of the contaminated soils from the Kent site and the 5615 West Marginal Way site will be requested from WDOE.

Assuming the prior remediation activities at the Juneau and Ketchikan sites are sufficient to meet ADEC cleanup standards, reports on the treatment and final disposition of the soil will be prepared and submitted to ADEC, and written acknowledgment of site closures will be requested.

Upon completion of adequate contaminant level reduction, soils treated at the Kent site will be prepared to meet AML engineering standards for subpavement construction and delivered to the Dock One Site.

## 7.0 SIMILAR PROJECTS/REFERENCES

Soil and/or groundwater contamination remediation associated with fuel storage systems for hotel and tour coach maintenance facilities throughout Alaska, including design, installation and operation of several soil treatment systems, 1990-1993.

Daniel S. Grausz,  
Vice President and General Counsel  
Holland America Line-Westours, Inc.  
300 Elliott Avenue West  
Seattle, Washington 98119  
(206) 286-3490, Fax: (206) 284-8332

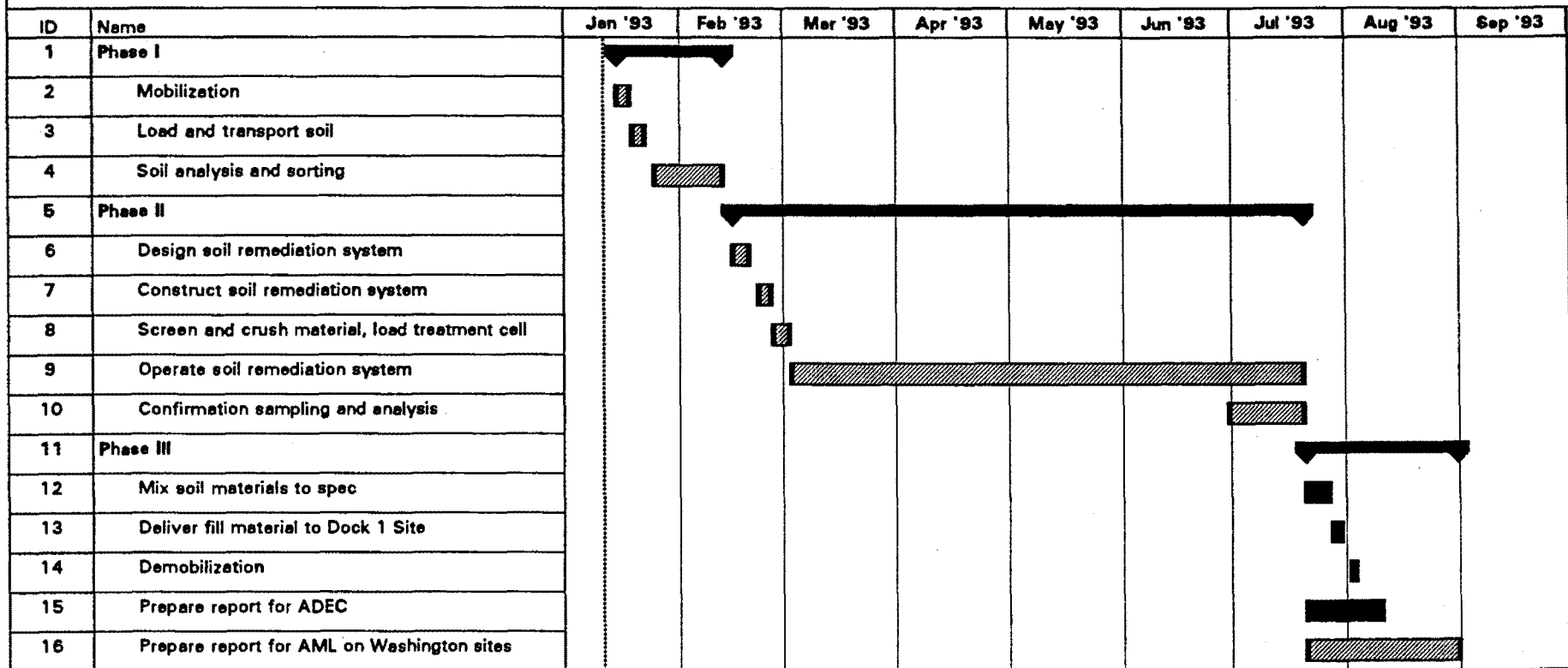
Soil remediation at the former site of an asphalt plant in Anchorage, Alaska, 1991-1993.

Les Pace  
Tudor Fund  
4201 Tudor Centre Drive, Ste. 300  
Anchorage, Alaska 99508  
(907) 561-2888

Design, installation and operation of an innovative system for the reclamation of methanol from contaminated soil at Fairbanks, Alaska, 1990.

W. B. Beach  
ARCO Alaska, Inc.  
Contracts Department  
P.O. Box 100360  
Anchorage, Alaska 99510-0360  
(907) 276-2010

Figure 1 - Project Timeline



AML Remediation  
1/11/93

Critical



Progress



Summary



Noncritical



Milestone

